

Amendments to the Claims

1. (Currently Amended) A valve plate structure comprising:
open/shut means for inhaling and discharging fluid through piston movement, said open/shut means including a suction plate and a discharge plate; and
a valve plate including a suction port coupled with the open/shut means for inhaling fluid through piston movement, a discharge port for discharging fluid through piston movement and a groove section having a plurality of continuous grooves provided to each surround at least a majority of the outside of the suction port or the discharge port, said plurality of continuous grooves being located beyond an edge of said suction plate or said discharge plate,
wherein in a direction extending away from a center of the suction port or the discharge port of the valve plate, each successive one of the continuous grooves has an increasingly greater width than a width of an adjacent continuous groove disposed immediately inside thereof, whereby vibration and noise in various frequency bands generated from the collision of the suction valve or the discharge valve with the valve plate are reduced.

2. (Previously Presented) The valve plate structure according to claim 1, wherein the open/shut means includes:

a suction valve having said suction plate at a position corresponding to the suction port of the valve plate to intake fluid through piston movement;

a discharge valve having said discharge plate at a position corresponding to the discharge port of the valve plate to discharge fluid; and

a head cover having a suction tube formed at a position corresponding to the suction port of the valve plate and a discharging tube formed at a position corresponding to the discharge port of the valve plate.

3. (Original) The valve plate structure according to claim 1, wherein the fluid is a coolant.

4. (Currently Amended) The valve plate structure according to claim 1, wherein each one of the plurality of continuous grooves has a width different from one another is a closed groove formed so as not to come in contact with a perimeter of the valve plate.

5. (Currently Amended) The valve plate structure according to claim 1, wherein the grooves are circles or polygons when viewed from a top of the valve plate.

6. (Currently Amended) The valve plate structure according to claim 1, wherein the grooves are polygons when viewed from a top width of the continuous grooves increases extending away from the center of the suction port or the discharge port of the valve plate.

7. (Previously Presented) The valve plate structure according to claim 1, wherein the grooves are fixed in depth.

8. (Currently Amended) The valve plate structure according to claim 1, wherein each one of the plurality of continuous grooves includes at least one circular groove, at least one rectangular groove, and at least one octagonal groove when viewed from a direction perpendicular to a plane of the valve plate has a different shape from one another.

9. (Currently Amended) The valve plate structure according to claim 1, wherein each of the continuous grooves have has a cross-sectional shape of an inverse triangle to rapidly decrease in width extending downward in a depth direction.

10. (Currently Amended) The valve plate structure according to claim 1, wherein the continuous grooves are U-shaped in a cross-section to gradually decrease in width extending downward in a depth direction.

11. (Previously Presented) The valve plate structure according to claim 1, wherein opening or closing functions of the open/shut means are operated via a pressure difference.

12. (Currently Amended) A valve plate structure comprising:
open/shut means for inhaling or discharging fluid through piston movement, said open/shut means including a suction plate and a discharge plate; and

a valve plate including a suction port coupled to the open/shut means for inhaling fluid through piston movement, a discharge port for discharging fluid through piston movement and a continuous groove spirally provided to surround the outside of the suction port or the discharge port, the continuous groove being located beyond an edge of said suction plate or said discharge plate,

wherein a width of the continuous groove increases steadily as the groove spirals outward from the suction port or the discharge port, whereby vibration and noise in various frequency bands generated from the collision of the suction valve or the discharge valve with the valve plate are reduced.

13. (Currently Amended) The valve plate structure according to claim 12, wherein as the continuous spiral groove spirals outward from the suction port or the discharge port, a gap between adjoining portions of the spiral

~~increases steadily in size contacts with the suction port or the discharge port at one end thereof and has a spiral shape that increases in width extending outward.~~

14. (Currently Amended) A valve plate structure comprising:

a suction valve to intake a low pressure coolant through a linear reciprocating movement of a piston, and including a suction plate and a discharge plate opening and shutting in response to the reciprocating movement;

a valve plate coupled with the suction valve, and including a suction port for inhaling the low pressure coolant through the piston movement, a discharge port for discharging a high pressure coolant through piston movement, and a groove section having a plurality of continuous grooves provided to each surround at least a majority of the outside of the suction port or the discharge port, ~~said plurality of continuous grooves being located beyond an edge of said suction plate or said discharge plate;~~

~~a discharging discharge~~ valve coupled with the valve plate for discharging the high pressure coolant through the reciprocating movement of the piston, and opening and the shutting in response to the reciprocating movement; and

~~a head cover coupled with the discharging discharge~~ valve, and including a suction tube formed at a position corresponding to the suction port of the valve plate and a discharging tube formed at a position corresponding to the discharge port of the valve plate,

wherein said plurality of continuous grooves are located beyond an edge of said suction plate or said discharge plate, and in a direction extending away from a center of the suction port or the discharge port of the valve plate, each successive one of the continuous grooves has an increasingly greater width than a width of an adjacent continuous groove disposed immediately inside thereof, whereby vibration and noise in various frequency bands generated from the collision of the suction valve or the discharge valve with the valve plate are reduced.

15. (Currently Amended) The valve plate structure according to claim 14, wherein the suction valve, the valve plate, the discharging ~~discharge~~ valve and the head cover are coupled via a bolt.

16. (Currently Amended) The valve plate structure according to claim 1, wherein each one the plurality of continuous grooves completely surround surrounds the outside of the suction port or the discharge port.

17. (Currently Amended) The valve plate structure according to claim 14, wherein each one of the plurality of continuous grooves completely surround surrounds the outside of the suction port or the discharge port.

18-20. (Cancelled)